marks the beginning of research on the biology of soils of the arid regions. Some of the facts gleaned in these studies present such striking features that it was thought wise to make a brief preliminary report on them in this journal. The facts may be categorically enumerated as follows:

1. Nitrite formation from ammonia compounds formed by the ammonifying bacteria has been found to take place markedly at depths of twelve feet in a soil from Haywards, Cal. Further, in samples gathered under the greatest precautious to avoid contamination, nitrite formation was found to go on actively at a depth of five and one half feet in a soil gathered at Riverside, Cal. Below five and one half feet there was a compact layer of hardpan in which there was little or no bacterial growth and nitrite formation could not, therefore, be expected deeper down in that particular soil. In six other soils collected in different parts of this state nitrite formation was found to depths of six feet or as far down as we had gone for samples.

2. Contrary to expectations *nitrate* formation, unlike nitrite formation, has thus far been noted only down to a depth of two feet. Further experiments, however, will be instituted to ascertain if this holds true for all California soils.

3. A bacteriological examination of a soil from Auburn, kept in a tightly stoppered bottle on the museum shelves for thirty-one years, reveals at least one representative of each of the groups of nitrogen-transforming or nitrogen-assimilating bacteria, except *B. radicicola.* Of these, several species of ammonifiers were found, one species of nitrosomonas (obtained in the motile and also in the zoogloœa form) and one spiecies of *Azotobacter.* The latter exhibits marked differences from the other *Azotobacter* species thus far described, both morphologically and physiologically, and it was therefore named *A. hilgardii* in appreciation of the eminent services of Professor E. W. Hilgard to scientific agriculture. Briefly, the organism may be described as a small elliptical cell, which forms no pigment and only a very thin membrane at the surface of mannite solutions. It is non-motile and has a slight nitrogen-fixing power.

4. The species of nitrosomonas found in the old soil mentioned above was found to have spores. This is particularly interesting, since Winogradsky stated in a report of results of his wonderfully thorough experiments on the nitrifiers, that spores were *never* observed.

No *Nitrobacter* species or nitrate organism has as yet been found in the old soil.

The above facts are probably due chiefly to the great perviousness of the soils of the arid region, owing to the very slow formation of clay substances; whereby moisture, air and roots are enabled to penetrate to depths rarely found in the humid regions.

Chas. B. Lipman
Laboratory of Soil Bacteriology,
University of California,
May 12, 1909

A SCHEME TO REPRESENT TYPE HEREDITY IN MAN

Efforts to reconcile Mendel's laws with the prevailing views of blended effects in heredity need not be unavailing, if the two may be considered as phases of the same process acting at different times during the life history of an elementary species.[1]

Heredity represents all the changes of organic life by three factors:

1. *Determinants,* which are in the germ plasm.

2. *Modifiers,* which are all influences through time and space that act on the germ plasm, and

3. *Laws of change,* which are the rules of conduct by which the determinants and the modifiers interact.

These factors are variable when looked at through all space and during all time, but for any elementary species in a given space and for a limited time they are fixed.

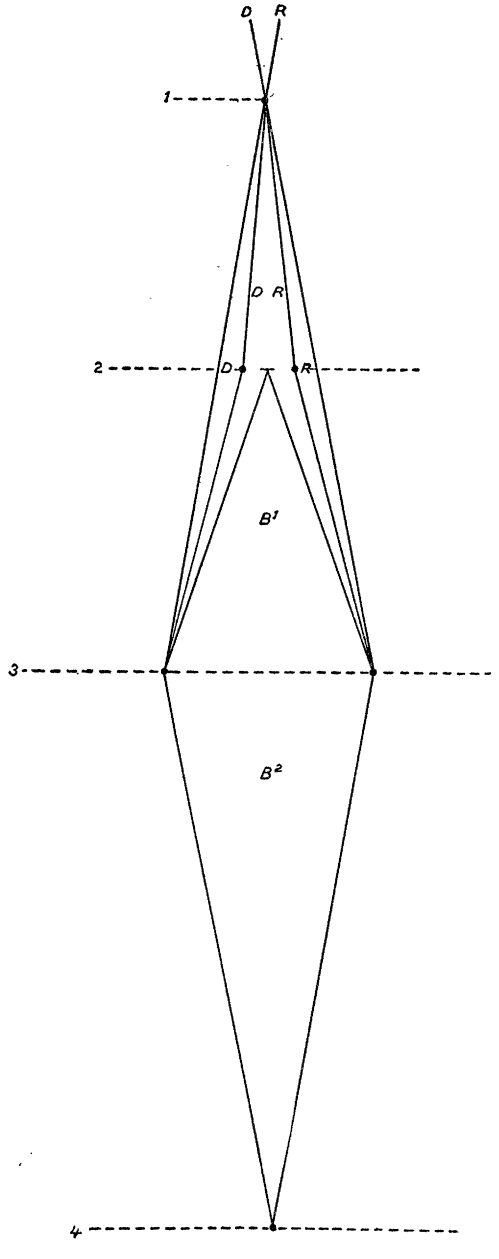
I present herewith a tentative scheme to supplement my theory of heredity.[2]

D and *R* represent homozygotes of an

[1] Spillman, Science, N. S., Vol. XXVII., 1908, pp. 47–57.

[2] Bean, *Philippine Journal of Science,* 1908.

allelomorphic pair that meet at 1 in sexual union, begin to blend at 2, present the picture of a variable blend at 3, and fuse completely



into a perfect blend at 4. A cross-section of the diagram above line 3 represents the relative number of individuals of the different kinds present at that time. The width of the diagram also indicates the amount of variation at any time. D = homozygous dominants. R = homozygous recessives. DR = heterozygotes. B^1 = a variable blend ever increasing in number with each successive generation while D, R and DR decrease to disappear entirely at 3. B^2 represents the continuation of the blend without either of the originals of the allelomorphic pair, but with all shades of intervening characters blending in various ways as influenced by ancestry and by environment, until a homozygote is formed at 4.

From 1 to 2 true Mendelism exists, spurious Mendelism is found from 2 to 3, and from 3 to 4 no Mendelism is present but two tendencies prevail, (*a*) the reversion to type, and (*b*) the tendency to blend.

The three Mendelian (?) conditions may exist at the same time in a single individual, one character exhibiting true Mendelism, another false and a third no Mendelism, or only one condition may be present at one time.

Davenport and Davenport[3] have established true Mendelian heredity for eye color in man; Bateson[4] has designated many conditions in man which indicate spurious Mendelism; and Boas[5] has suggested the two hereditary tendencies above mentioned, when broad-headed and long-headed, or wide-faced and long-faced individuals are united in marriage.

My records of Negroes, of white students, and of the Filipinos suggest that composite types (elementary species?) of men when crossed with opposite types follow the laws of Mendel for not many generations, then begin to blend, and eventually fulfill the requirements of my scheme delineated above. At present all mixed races are probably in a condition of spurious Mendelism or no Mendelism. Among the Negroes in America the Hottentot is rarely seen, the Kaffir is often encountered, and the Guinea Coast Negro is abundant, but the majority of the Negro population represents a variable blend of different Negro types, and a large number of mixed

[3] SCIENCE, N. S., Vol. XXVI., 1908, p. 589.

[4] *Brain*, 1906.

[5] *American Anthropologist*, 1903, 1907.

bloods. Among 1,000 students at Ann Arbor, I observed a few of each of the types of Europe such as the Iberian, Northern, Alpine, Celt, Littoral and Adriatic, but the majority of the students observed were variable blends, and the pure types were not exactly like the prehistoric types of Europe from which they were probably derived, although similar to them in many ways. During the past year my anthropometric investigations have included the Filipinos of many provinces, but especially the Igorots. Here as elsewhere pure types are rare and blends are plentiful. Three primary types (each represented by 8 or 9 individuals selected from 104 Igorots) are found among the Igorots. None of these are pure, however, but one type resembles the Negrito, another resembles one of the prehistoric types of Europe, while the third is unlike either of the others, but not a blend of the two. The majority of the Igorots represent a variable blend, and they have been so long isolated that a condition of no Mendelism has been reached. There is conclusive evidence of the persistence of type, yet the tendency to blend is emphatic.

Robert Bennett Bean
Philippine Medical School,
Manila, P. I.

A NEW EDIBLE SPECIES OF AMANITA

During the autumn of 1908 I received specimens and sketches of an interesting species of *Amanita* which grows in the mountain forests of California. The specimens were collected and communicated by Mrs. Virginia Garland Ballen, of Brookdale, Santa Cruz County, Cal. The sketches were accompanied by careful notes which Mrs. Ballen had made from her studies and observations. While the plant shows certain points of relationship to *Amanita cæsarea,* especially to the robust European form, Mrs. Ballen had recognized that it was different from the American form of *A. cæsarea,* which is more slender, and in fact it proves to differ in several ways from that species. The plant is edible and often very large, so that a single one is sufficient for a meal. Pending a fuller illustrated account, a brief description is given here.

Amanita calyptroderma Atkinson and Ballen n. sp. Plants 10–15 cm. high, pileus 10–22 cm. broad, stem 2–4 cm. stout. Pileus maize yellow to chrome yellow; gills white, then pale maize yellow to cream color; annulus and stem pale maize yellow to cream color. Pileus stout, extreme margin striate, the central and larger portion covered with the closely adherent white calyptra of the volva; in age of the larger plants this calyptra sometimes cracking into areas. Gills adnexed. Spores oval to elliptical, 8–12 $\times$ 7–8 μ. Annulus very thin, membranaceous, superior, evanescent. Stem hollow with loose cottony threads. Volva white, thick, circumscissile, in dehiscence, the upper portion remaining as a thick skin over the central portion of the pileus; limb very prominent, forming a broad cup- or saucer-shaped structure from which the stem of old plants often separates readily.

Geo. F. Atkinson

THE AMERICAN ASSOCIATION OF MUSEUMS

The fourth annual meeting of the American Association of Museums was held in Philadelphia, May 11–13, President W. J. Holland, director of the Carnegie Museum in Pittsburgh, presiding. The following papers were read:

"Cooperation in Scientific and Educational Work between Museums," by President William J. Holland.

"Cooperation among College Museums," by Dr. Daniel S. Martin.

"Cooperation between Museums in Expert Work," by Dr. Edwin A. Barber. (Read by title only.)

"The New Staten Island Museum and its Work," by Mr. Charles Louis Pollard.

"The Insect Pests of Museums," by Mr. C. T. Brues. (Read by title only.)

"Invertebrate Models and Exhibition Groups," by Mr. Roy W. Miner. (Illustrated.)

"The Children's Museum, its Methods of Work and its Results," by Miss Anna Billings Gallup. (Illustrated.)

"The Use of Unkerheimer's Solution for Preservation of Natural Foliage," by Mr. Adolphe B. Covert. (Illustrated.)

"The Darwin Exhibit at the American Museum of Natural History," by Mr. Roy W. Miner. (Read by title only.)